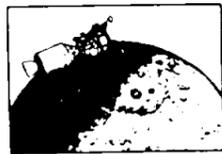


MSC Is Renamed "JSC"

ROUNDUP



NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS

Vol. 12 No. 8

March 2, 1973

President Nixon recently signed a Senate resolution designating the Manned Spacecraft Center as the "Lyndon B. Johnson Space Center" in honor of the late President.

In a statement, Nixon said, "Few men in our time have better understood the value of space exploration than Lyndon Johnson."

"By his vision and his work and his support, Lyndon Johnson drew America up closer to the stars, and before he died he saw us reach the moon—the first great plateau along the way."

Christopher C. Kraft, Jr., director of the Spacecraft Center said, "The people of the Manned Spacecraft Center have always had the greatest respect for former President Lyndon Baines Johnson, and for the key role he played in placing this country in a pre-eminent position in space flight."

"He was very perceptive in the values to be gained by breaching the frontiers of space as a national effort, and history will show him as one of the leading pioneers in

this field."

"We are pleased and proud to have our center bear this great American's name."

Texas Senator Lloyd Bentsen, who proposed the renaming of the Center, stated, "Lyndon Johnson deserves this honor more than any other individual. Just as the Houston facility is a physical center of the space program, he was, perhaps, the spiritual center."

President Nixon noted that as a senator, Johnson drafted, introduced and helped enact legislation that created NASA. He said that Johnson called his years as a senator "the proudest legislative achievement in his years in the Congress."

"As vice-president," Nixon added, "he was chairman of the National Aeronautics and Space Council in the critical, early years of exploration when the groundwork was laid, and the determination was made to put a man on the moon."

Kraft said that there will be dedication ceremonies as soon as plans can be formulated.

Annual Lunar Science Conference Pending

More than 750 scientists are expected to take part in the Fourth Annual Lunar Science Conference March 5-8, at the Lyndon Baines Johnson Space Center (formerly the Manned Spacecraft Center.)

Principle investigators from the United States and a dozen foreign countries who have participated in the lunar scientific research phase of the Apollo program, will present more than 250 papers in the four-day session, including the preliminary results from Apollo 17—the final Apollo lunar exploration mission.

Scientists from the Soviet Union will also present papers on their samples.

The Conference will open with a welcoming address by NASA Deputy Administrator George M. Low and a general session in the Center's Auditorium

March 5. Concurrent sessions on different disciplines of the lunar science field will be held in smaller meeting rooms at the Center throughout the remainder of the Conference.

Topics to be covered by conference sessions range widely through several lunar scientific disciplines. Among the session topics are Origin and Interior Structure of the Moon, Where and When are Lunar Magmas Formed? Origin and Time of Formation of Lunar Breccias and Moon-Sun-Space Interactions.

The results from the final two Apollo lunar landing missions have raised many questions about the early evolution of the lunar crust and highlands, and the Conference will be the first opportunity for scientists to compare their widely-varying interpretations.



LBJ AT MSC—The late President Lyndon Baines Johnson examined the latest in Apollo haberdashery during his tour of the MSC Lunar Receiving Laboratory March 1, 1968. In the suit was suit technician John Mays. Behind them are then NASA Administrator James Webb and MSC Astronaut Office chief Alan B. Shepard, Jr.

JSC Signs Supplemental Agreement

JSC has signed a supplemental agreement valued at \$3,312,559, with the Grumman Aerospace Corporation, Bethpage, New York, for changes to the Apollo Lunar Module.

The agreement incorporates into the contract, changes authorized by NASA for modifications

to the LM for additional scientific payloads as required by Apollo missions 15, 16, and 17.

The modifications bring the total estimated value of the Grumman contract since January 1963, to approximately \$2,004,451,407.

NASA Survey To Be Taken

In the next week, a randomly selected group of employees will be asked to respond to a NASA-wide survey and a smaller group to participate in subsequent group discussions.

The purpose of this effort is to assess the NASA internal environment. Those selected will receive a short questionnaire asking for anonymous comments on several factors in the current work environment and on their level of interest for each factor.

After the questionnaire has been completed, a small number of employees will be asked to discuss the more important factors identified in the questionnaire.

The results of the survey will be reviewed by the Personnel Management Review Committee (PMRC) and its Subcommittee on Young Employees (SYE), of which Mike Christensen—JSC employee—is a member and the findings will be fed back to the Center.

The PMRC is composed of senior management officials from several NASA centers and Headquarters who are responsible for providing the Administrator with policy guidance and feedback on significant personnel issues.

The SYE was established by the PMRC to advise them primarily in the area of utilization and development of young professionals. Any questions about the survey or the PMRC and SYE should be directed to the representative mentioned above.



W. H. (Bill) Gray, (right) Chief Engineering Division, presents a plaque from co-workers and friends to William A. (Bill) Milam. Milam (left) retired from Government Service January 20, 1973. He was employed in the Engineering Division, Construction Branch.



BLACKS PRESENT PAINTING—Commemorating Negro History Week, black employees of JSC presented to the Center a painting of Arctic explorer Matthew Henson. The first man to reach the Northpole, Henson, a black man, placed the American flag precisely on this destination April 7, 1909. The event at that time was probably as exciting as when man first landed on the moon. Presenting the painting to JSC Director Christopher C. Kraft are Joe Fuller (right) and Quarance Patin (left).

Skylab Missions I, II, III, Now Have Emblems



Skylab I

The emblems for the three Skylab manned missions have been chosen. Skylab is an experimental space station consisting of a 100-ton laboratory complex in which medical scientific and technological experiments will be performed in Earth orbit.

Skylab I will have a duration of up to 28 days. The prime crew of this mission will be Astronaut Charles Conrad, Scientist-Astronaut Joseph P. Kerwin, science pilot; and Astronaut Paul J. Weitz, pilot.

The patch for the first mission, designed by artist Kelly Freas, shows the Skylab silhouetted against the Earth's globe, which in turn is eclipsing the sun.

The second manned Skylab mission will be a mission of up to 56 days. The members of the prime crew of this mission will be As-

tronaut Alan L. Bean, commander; Scientist-Astronaut Owen K. Garriot, science pilot; and Astronaut Jack R. Lousma, pilot.

The patch symbolizes the main objectives of the flight. The control figure, adopted from one by Leonardo da Vinci, illustrates the proportions of the human form and suggests the many studies of man himself to be conducted in the zero-gravity environment of space.

This drawing is superimposed on two hemispheres, representing the two additional main areas of research—studies of the Sun and the development of techniques for survey of the Earth's resources. The left hemisphere shows the sun as it will be seen in the red light radiated by hydrogen atoms in the solar atmosphere.

Television displays will allow the crew to point an array of large telescopes with great precision at features of interest, such as filaments and active regions, also shown on the patch. The right hemisphere is intended to suggest the studies of Earth resources to be conducted on Skylab.

Various techniques will be examined, with photographs and electronic images, at many wave lengths, to evaluate and develop the potential of this important new area. These surveys will be used in forestry, geology, hydrology, agriculture and other disciplines.

The third Skylab manned mis-

sion will also have a duration of up to 56 days. The members of the prime crew of this mission will be Astronaut Gerald P. Carr, commander; Scientist-Astronaut Edward G. Gibson, science pilot; and Astronaut William R. Pogue pilot.

The symbols in the patch refer to the three major areas of investigation proposed in the mission. The tree represents man's natural environment and relates directly to the Skylab mission objectives of advancing the study of Earth resources.

The hydrogen atom, as the basic building block of the universe, represents man's exploration of the physical world, his application of knowledge, and his development of technology.

Since the Sun is composed primarily of hydrogen, it is appropriate that the symbol refers to the solar physics mission objectives.

Human silhouette represents mankind and the human capacity to direct technology with a wisdom tempered by regard for his natural environment. It also directly relates to the Skylab medical studies of man himself.

The rainbow, adopted from the Biblical story of the flood, symbolizes the promise that is offered man. It embraces man and extends to the tree and the hydrogen atom emphasizing man's pivotal role in the conciliation of technology with nature.



Skylab II

Space Club Holds Essay Contest

The National Space Club announced the opening of the Robert H. Goddard Historical Essay Award competition for 1973.

This annual nationwide competition, with a \$500 prize, is open to any U. S. citizen.

The contest is named in honor of the world rocket pioneer, Dr. Robert H. Goddard, whose scientific and technological contributions—although belatedly recognized in the United States—helped open the door to space.

Essays may treat with any significant aspects of the historical development of rocketry and astronautics and will be judged on their originality and scholarship. They may bring new information to light or may cast a new and

(Continued on Page 3)



Skylab III



Honorary Diploma—Dr. Charles Fuller (2nd from left) recently received an honorary diploma from the American Veterinary Epidemiology Society for distinguished service and contributions to the progress of public health. Presenting the diploma is Dr. James Harlan Steele, Director of the Institute of Environmental Health, UT, School of Public Health at Houston. Looking on approvingly are (left to right) Dr. Wayland E. Hull, Dr. Royce Hawkins, Dr. George Armstrong and Dr. Charles Barnes.

ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON TEXAS



The Roundup is an official publication of the National Aeronautics and Space Administration Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for JSC employees.

Editor: Janet Wrather

Photographer: A. "Pat" Patnesky

\$25 Prize to be given For Best Picnic Theme

Again this year, a prize of \$25 will be given to the employee who suggests the best theme for the Center's 1973 picnic. A committee has been formed to select the winners. Last year's winner was Pat Nobles of the Personnel Office. Her suggestion was "Election '72."

To submit suggestions fill in the form below and mail the entry before March 23, 1973.

The picnic will be in the fall again this year. Although the fall-vs-spring tally was exceptionally close, those

who voted for a fall picnic had the greatest number of votes.

"The comments and suggestions on improving the picnic which accompanied last year's survey forms proved helpful," Phonicille De Vore of the awards office said. "We intend to consider all of them and implement as many as we can, depending, of course on whether or not they can be adapted to the theme chosen for this year."

The 1973 picnic chairman is Betty Cornett; the co-chairman is Evon Collins.

I suggest that the theme for the 1973 JSC picnic be-----

Additional remarks:-----

Code and Signature

Mail to PA Carol Schrader prior to March 2, 1973.

Space Club Essay Contest

(Continued From Page 2)

different light upon events or individuals influencing rocketry and astronautics in the United States.

Entries should be submitted by November 1, 1973 to the Goddard Historical Essay Contest, c/o National Space Club, 1629 K Street, N. W., Washington, D. C. 2006. The winner, who will be announced at the Awards Ceremony in early 1974, will receive the Goddard Historical Essay Trophy, Certificate and a \$50 prize.

The Robert H. Goddard Historical Essay Award was the first literary competition devoted to historical affairs in the field of rocketry and astronautics.

Rules of the Contest

1. Essays should not exceed 5,000 words and should be fully documented.
2. Essays will be judged on the originality and scholarship by the Committee for the History and Rocketry and Astronautics of the National Space Club, and its decision will be final.
3. Essays should be received by the Chairman, Committee for the History of Rocketry and Astronautics, by November 1, 1973; the winner, if one is selected, will be announced early in 1974.
4. Entries may be submitted by any U. S. citizen, and evidence of citizenship should be included with essays submitted.

Roundup Swap-Shop

Swap Shop advertising is available to JSC and on-site contractor personnel. Articles or services must be offered as advertised, without regard to race, religion, sex or national origin. Ads should be 20 words or less, including home telephone number. Name and office code must accompany, but need not be included in ad copy. Typed or printed copy must be received (AP3 Attn: Roundup) by Thursday of the week before publication.

MISCELLANEOUS

9' x 12' shag rug, 2-tone blue, xlnt cndn, \$70, 332-1092.
2 green bar stools, li nw cndn, used little, were \$9.50 ea, now \$15 for both, 941-5464.

Fabugas boat seats, back-to-back lounge type, vinyl, li nw gold, also 3 snap cushions, \$75, Cotter, 337-1172.

Astroworld tickets 5 good anytime \$10, \$125, Grandfather clock Circa 1900, \$250, Maple bdrm suit, \$140, Gulbransen Electronic Organ, Pacemaker w/ percussion, \$850, many small pieces of furniture and misc, Maj Snyder, 483-6381 or 488-5345.

Five new original equipment tires from Dodge Van, H78-15 (B) blackwall, 941-0262.

100% human hair fall, blc, cost \$60, will sell for \$30, twin bed ncl mattress, box springs, frame, xlnt cndn, \$40, dressmaker sewing machine, xlnt cndn, incl all accessories, cnsl mdl used twice, cost \$225, will sell for \$150. GE portable b/w TV, 19" nds minor repair, \$25, Packard Bell portable color TV, 19", xlnt cndn, less than one yr old, \$250, 944-6988 after 5:30.

Remington bolt action 22 rifle, 5 shot clip, ugly, but servicable, \$12. 488-3966.

Superex Electrostatic stereo headphones, live concert realism, \$75, Koss Pro 4 AA's \$35, 2 mos old, warranty, Jones, 944-1321.

Set chrome steel "mag" wheels, oval slot design, 14" DIA x 7 inch rims, all hware incl, li nw, \$95, JJim, 488-2188.

36" Caloric gas range, center teflon griddle, Rottisere all deluxe features, white, sell or trade, for 12-14 color portable, underhill 482-6122, after 4:30.

Remington BDL 700 Cal 308 Bushnell 6 pwr on Redfield mts, mint cndn, \$110, Hull, 334-3134.

Camera, Pentax 35mm SLR, f/1.8 lens carrying case, all li nw, \$125 or best offer Jeff, 941-6656 aft 6 p.m.

Two infant car seats, well used but servicable, \$7.50 for both, 944-8717.

Hawes 44 Magnum hand gun w/ pearl grips, quick draw holster and shells, used once, \$95, 332-3846 after 6 p.m.

HOUSEHOLD ARTICLES

GE Electric Range, large oven, gd cndn, white exterior, \$35, Weber 944-8880.

Dining table and 6 chairs, 2 end tables, coffee table, 2 lamps, \$100, early American back recliner, \$100, 482-7546.

Sofa-bed, vinyl biege, \$45, recliner, vinyl green, \$35, chair, vinyl biege, \$20, all for \$90, 946-4311.

Portable Sony AM-FM radio w/ cassette recorder, xlnt cndn, \$50, 333-3425 aft 5 p.m.

Genuine Brass bed, polished and in xlnt cndn, \$275, 521-9805.

Dinette set, table and 4 chairs, \$25, Stuart 333-3210.

VEHICLES

70 VW Campmobile, poptop, sink, ice-box, sleeps 4, AM-FM radio, xlnt cndn, \$2195, 332-1092.

69 Chev truck, 3 4 ton, auto, air, radio, custom camper model, 482-6343 after 5 or 483-6316.

72 Plymouth Fury III pwr s/o, a, c, 24,000 mi AM-FM radio Kelley, 649-8401.

Two 26" bikes, \$13 ea, 1 infant baby carrier, \$4, Hector, 488-0217.

69 or 70 Corvette 4-spd & accessories in gd cndn, B. Reina, 488-1326.

Penton 100, many xtras, \$375, Suzuki 90, chamber, nw sprocket & chain, \$250, 334-3461.

Honda 71 CL 100 \$225, 481-0608.

57 International Travelall, gd running cndn, nw battery, brakes, gd tires, best offer, 554-7263.

69 Pontiac Catalina, 4-dr, pwr, air radial tires, 51,000 mi, xlnt cndn, \$1595, 488-4412.

72 Honda CB 500 - 4 wi helmet, 2000 mi, \$1095, Gibson, 333-3912.

69 Buick Riviera, loaded, still in warranty, \$2900, 488-4372.

64 Pontiac 9 pass sta wgn, auto, pwr, air rack, vinyl int, lw mi, \$500 or best offer, Wiltz, 944-0451.

69 Valiant Signet 4-dr, auto, air, radio, pwr str, 4-nw tires, gd cndn, \$1175, 334-2929.

66 LTD w/ equalizer hitch, \$725. 22 ft Travel Trailer, air, \$2495, 6 p.m., Rudy, 471-4071.

69 LeMans, my loss your gain, \$1595, 471-4071.

69 Buick LaSabre Custom 4-dr Sedan, pwr str, brakes, fact air, nw tires and battery, xlnt cndn, Paul, \$1650, 334-2391.

67 Ford 1/2 ton Ranger Pickup, radio, heater, air, auto trans, nw tires, Stuart, 333-3210.

72 Honda 350 lw mi, li nw, \$750, Wood, 482-3059.

69 Olds 88 Custom 4-dr sedan, loaded, xlnt cndn, gd tires, equity, pick-up bank note, Wilson, 472-2457 aft 6 p.m.

64 Chev Impala 4-dr ht, runs well, nds body work, \$165, Wilson 472-2457 aft 6 p.m.

64 Rambler st wgn, V-8, \$240, 488-0094.

70 Chev pickup, V18, stan trans, air camper shell, xlnt, \$1950, O. Jones, 944-2124.

65 Grand Prix, one owner, gd cndn, new ball joints, shocks, battery, almost new tires and brake job, best offer, 481-1918 aft 5, Gonzales.

Nimrod Riviera foldout camping trailer, xlnt cndn, \$350, Rutherford, 481-1671.

71 Buick Sport Wgn, 47,000 mi, xlnt cndn, tape deck, cruise control and other xtras, 488-3377 aft 5 p.m.

71 late, Toyota Mark II 2-dr, 12,000 mi, air, dealer serviced, deal or trade (prefer older pickup as partial) Underhill, 482-6122 aft 4:30.

70 Ford truck, sports custom, ovdrive, 6 cyl, long and wide, overloads, \$1825, Monford, 945-7893.

70 VW 9 passenger bus, well cared for, air, \$1600, 334-2993.

70 Triumph Trophy 250 cc cycle, fine cndn, 6000 mi, \$325, 334-2993.

72 Chevy C-10 pickup, V-8, air, pwr brakes, radio, xlnt cndn, warranty, \$2795, Jones, 333-4093.

Minibike, 2 1/2 hp, nw motor, gd cndn, \$65, Fenner, 481-2164.

70 Ford LTD 10 passenger Country Square Wgn, loaded w/ xtras, dual facing rear seats, nw tires, Stuart, 333-3210.

PROPERTY & RENTALS

Friendswood, 1.5 acre tract adjacent to high school, \$7300, owner financed, 482-financed, 482-3989 aft 6 p.m.

House for rent, Friendswood, 2-bdrm brick, carport, utility room, carpets, 482-7642 or 488-6917.

Sagemont, 4-2-2, fireplace, living, dining, famiury rooms, gas built-ins, detached garage, nw loan or assume equity, Campbell, 481-1826.

Clear Lake City Townhouse for lease, 3-2 1/2-2, built-ins, private patio, on golf course, newly decorated, \$235 mo. 488-0730.

League City (Pecan Forest), 3-2-2, all electric, 1600 sq ft, fenced yd, no lease required, \$235 mo, 488-3353 days or 333-2880 evenings and wkenads.

Nassau Bay, Spanish, 4-2 1/2-2, 2500 sq ft, court yd, screened back patio, fenced bk yd, 6 yrs old, 488-3353 or 333-2880.

PETS

Two male toy Poodles, AKC reg, ready March 5, Halkan, 6261 or 331-45.27.

1 male German Shepherd, AKC reg, 8 wks old, 331-4527.

6 yr-old Buckskin Quarter Horse, nw saddle & bridle, 15 year old girl has outgrown him, 337-1839.

Free puppies, part black and tan Hound and part Golden Retriever, Huber, 344-3245.

Registered half-Arabian gelding, trophy winner, gentle, part welsh pony, Al, 575-1248.

Weimaraner male pup, championship stock, AKC reg, 334-1374.

Handsome male Dalmation, reg, gd line, 4 yrs, fine watchdog, pet and stud, \$75, Jones, 944-1321.

AKC Cocker puppy, male, red-blonde, 8 wks old, \$55, 334-2262.

14-yr-old Dapple Palomino mare, gentle, prfct child's horse, ribbons in Western pleasure trail classes, \$250, House, 482-7016.

BOATS

70 Seaking 14 ft, runabout, 35 h.p. engine, top, trailer, gd cndn, \$950, Colton, 488-2962.

14' wood boat, dry, windshield, remote control, 35 h.p. Evinrude, tilt trailer, \$275, Cotter, 337-1172.

Fully equipped Chrysler Conqueror w/ 120 outboard trailer, mint cndn, list over \$4400, now \$2995, Bland, 333-4580.

16' Zinncraft w/100 HP Evinrude and Sportsman Lift Roller Tilt Trailer w/ spare tire, nw top and windshield, extras, \$1200, Prince, 649-7852.

18' Lyman Clinker-built wooden Lapstrake, 90 hp Evinrude, big wheel galvanized trailer, loaded w/ xtras, \$1250, 944-4153.

NEBA Membership Drive Underway

The annual NASA Employees Benefit Association membership drive is presently underway.

NEBA's purpose is to provide, on optional basis, group life insurance at low cost. The Association is open to membership by permanent personnel and government employees detailed to NASA from other agencies.

In its 22nd year, the NEBA plan boasts more than 15,000 members with over \$340 million in force.

The amount of coverage is dependent on the member's salary, up to \$35,000 for the member, up to \$5,000 for spouse and \$1,000 for each eligible child.

During the current insurance year, April 1, 1972 to March 31, 1973, each member has the benefit of a 10 percent increase in coverage on the employee's life without an increase in cost. The 10 percent increase, at no cost to the member, will be effective through July 1.

Currently, membership is approximately 50 percent of those eligible. A "facts" brochure with an enrollment card will be mailed to each eligible non-member with in the next five weeks.

Coast Guard To Examine Boats

The U. S. Coast Guard Auxiliary will conduct a courtesy boat examination at Boat Town on NASA Road 1, 2 miles east of the Center on Sunday, March 18, 1973 from 9:30 a.m. until 5:30 p.m.

This courtesy examination covers equipment required by federal and state law plus the safety requirements of the auxiliary for the C. E. decal. Included are such things as boat registration papers and numbers on boat, life saving devices, fire extinguishers, running lights, flame arrestors, fuel systems, electrical systems, ventilation, anchor and lines, signal flares, bilge pumps, oar or paddle (A-class) and other safety features such as docking and mooring lines, fenders, tools, spare parts for emergency repairs.

If a boat does not qualify for the courtesy decal, the examiner can only advise the owner as to what he needs to meet the requirements.



BASKETBALL CHAMPS—Seen in the above picture are the Association Basketball Champs. Front row, (l to r), Ken Young, Rich Kruse, Tom Keeton, Al Morrey. Back row, (l to r), Rich Arbaugh, Amvp Shannahan, Herb Miller, Gene Ricks, Larry Ratcliff.

Quieter, Safer Aircraft Broad Goals of NASA

Quieter, safer aircraft that are more economical and provide better public service are broad goals in NASA's aeronautical research program. NASA scientists and engineers are tackling the problems besetting the growth of air transportation capacity needed to meet future U.S. travel demands. These demands are expected to grow 50 percent in the next 10 years.

New designs, new materials and new technology are pointing the way toward major reductions in aircraft noise and airport congestion.

Other approaches probe high-speed flight, developing the means to fly faster and smoother, with good economics.

NEW TECHNOLOGY

In hundreds of programs and projects that span the spectrum from hovering to hypersonic flight and from sea level to the stratosphere, NASA works in new fields of aeronautical technology.

Many of these programs relate directly to major problems in air

transportation, such as the noise of jet engines or air traffic congestion.

Other NASA work aims at the future, extending the technology base to give the U.S. new options in aeronautics.

The first results are encouraging. Work on jet engines has shown major reductions in noise levels and in exhaust emissions. The program includes the development of technology for an advanced, quieter jet engine, as well as modifications that will reduce the noise of current engines, and new flight procedures to make landings quieter.

Quiet, jet propulsive-lift aircraft, using such new technology as the augmentor wing or externally blown flaps, offer the promise of major increases in the capacity of existing airports. The performance and quieter operation of these short takeoff and landing aircraft make them good neighbors, able to serve smaller communities from small, more conveniently located general aviation airports or new Quietports.

VERTICAL TAKEOFF

One step further, NASA's vertical takeoff and landing technology program is a major effort aimed at development of better intra-urban and feeder airline transportation service.

A pivoting wing, that rotates 45 degrees about a vertical axis to point more forward and aft, looks like a strange way to fly, yet early studies of this unusual NASA wing concept point to quieter and more efficient operation at takeoff and low supersonic flight speeds.

Another unusual wing shape—NASA's supercritical airfoil—now is being flight-tested. The results show that it produces higher speed and greater range without increases in fuel consumption. The application to economical long-haul transportation is an obvious one.

CONSTRUCTION MATERIALS

Traditional construction materials for aircraft are being augmented by composites, combinations of materials and plastics,

which have better resistance to fatigue as well as lighter weight.

The result could be aircraft structural weights which are lessened by a third or so, with increases in airplane payload and savings in fossil fuels.

NASA "fly-by-wire" techniques replace conventional aircraft control cables and push rods with the lightweight power of electronic systems to improve flight performance and operating economics.

The safety and utility of general aviation aircraft are being improved by NASA studies and tests of these single and twin-engine types.

TRAILING VORTEX

The training wind vortex behind a heavy airplane causes a turbulent wake that is dangerous to smaller, lighter planes and even sometimes to larger transport aircraft.

NASA safety research is investigating the problems of the trailing vortex, and also is studying collision avoidance systems, automatic takeoff and landing

techniques, aircraft handling qualities and other safety items.

Edging toward space, NASA studies the unusual flight habits of lifting bodies, near-wingless aircraft that combine the flight characteristics of airplanes and spacecraft. They herald future spacecraft that can re-enter the atmosphere and fly to an aircraft landing at a conventional airport.

Very high speed flight research, leading to the development of technology for tomorrow, is another major portion of the NASA workload.

That workload today is the foundation of aeronautical progress tomorrow. It builds a technology that supports the broadest national missions and helps to maintain U. S. leadership in the international aerospace market—a major contributor to the U. S. balance of trade.

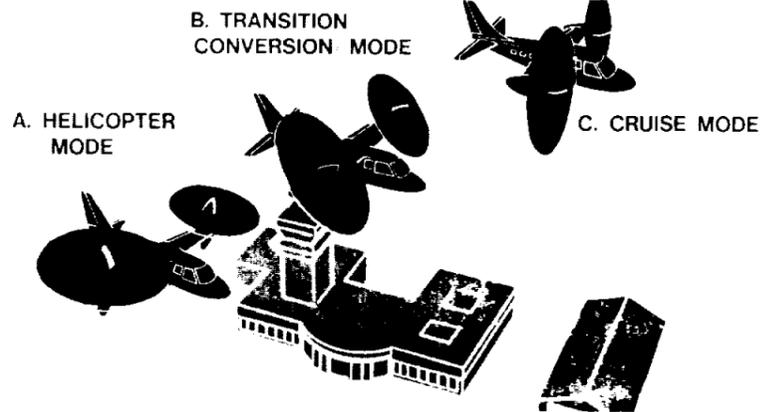
NASA's aeronautical research, its scientists and engineers, and its incomparable facilities, are a unique national asset.

JIMMY WARREN
MEMORIAL
BOWLING LEAGUE

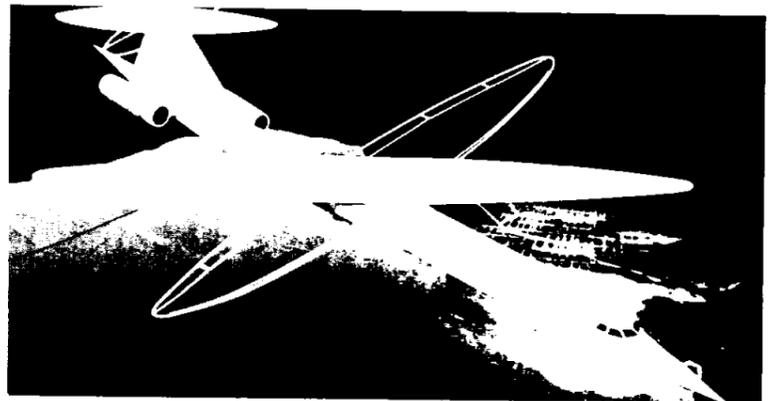
Team Standings	W	L
Ball Busters	53	31
Hexes	51	33
Ascenders	50	34
Pin Pounders	46	38
Jokers	50	34
Strikeouts	43	41
Spoilers	44	40
Chokers	39½	44½
Mixer	39	45
Clowns	37½	46½
Alley Oops	35	49
Hertz	33½	50½
Team No. 9	33	51
Clowns	37½	46½
High Team Set (3 games)	2-8-73	
Fabricators-3305		
2-15-73-Mixers	3072	
High Team Game		
2-8-73-Fabricators-1161		
2-15-73 Jokers	1081	
High Individual Set 2-8-73 Dan Kennedy-714		
2-22-73-Don Gross-683		
High Individual Game 2-8-73 Jim West 279		
2-22-73 Don Gross—272		



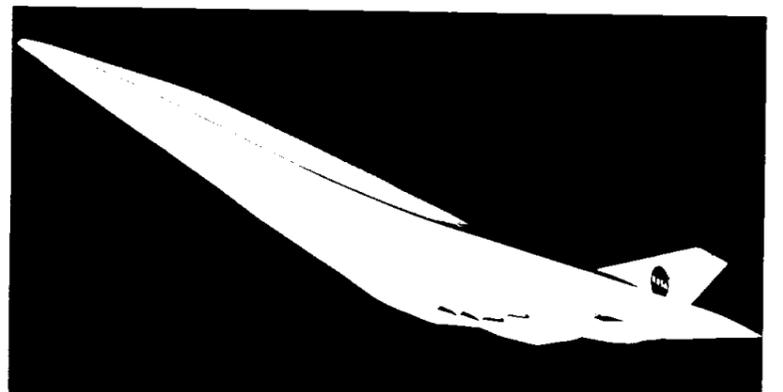
SHORT TAKEOFF AND LANDING—(STOL) STOL aircraft, using propulsive lift concepts like the augmentor wing, could operate from short runways increasing capacity of existing airports and bringing into use smaller community airports to reduce terminal congestion.



VERTICAL TAKEOFF AND LANDING—VTOL aircraft program is a research effort to develop high speed, vertical takeoff and landing aircraft technology with potential applications in intra-urban/feederline transportation and airport/airway congestion relief. The VTOL would require only a small operating area at airports.

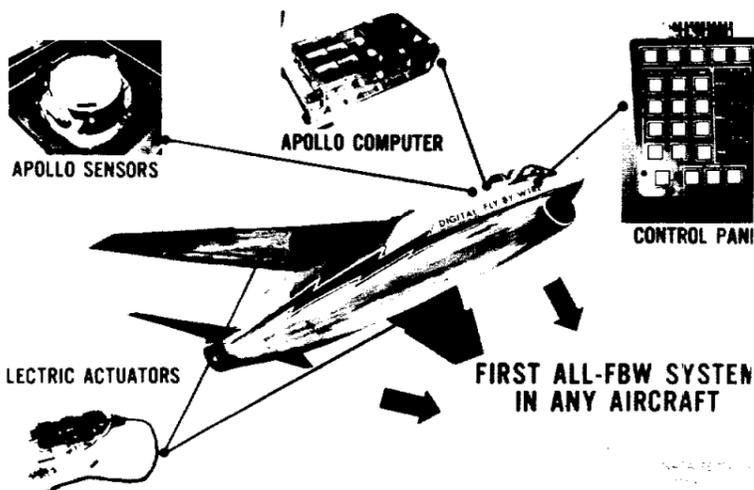


ANTISYMMETRICAL WING—Preliminary research studies indicate future jet transport employing NASA's antisymmetrical wing concept might operate more quietly and efficiently at both takeoff and low supersonic speeds. The wing pivots 45 degrees from normal for supersonic flight.



HYPERSONIC RESEARCH—Hypersonic flight, four to five times the speed of sound, has been routinely achieved by space vehicles and NASA's X-15 rocket research airplane. Using models in wind tunnels, NASA is studying the formidable problems of hypersonic flight, building the technology for tomorrow's aeronautical progress.

WHERE ARE WE NOW? PHASE IA



ELECTRONIC FLIGHT CONTROL—NASA's "fly-by-wire" experimental program is advancing electronic flight control technology for aircraft to significantly improve flight performance and operating economics for future long haul transports. The program uses two components developed in the Apollo manned lunar exploration program.

Present for the future.



Take stock in America. Give U.S. Savings Bonds